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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/066,638	02/06/2002	Masashi Ando	Q67810	6088

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EXAMINER
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OLSEN, KAJ K

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 04/04/2003

5

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/066,638

Applicant(s)

ANDO ET AL. 

Examiner

Kaj Olsen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 16-25 and 39 is/are pending in the application.
- 4a) Of the above claim(s) 24 and 25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16-23 and 39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 09/045,938.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s) ____.   |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> . | 6) <input type="checkbox"/> Other:  |

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 16-23 and 39, drawn to system for calibrating a gas sensor, classified in class 205, subclass 781.
  - II. Claims 24 and 25, drawn to system for detecting deterioration of occlusion catalyst, classified in class 60, subclass 277.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions II and I are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the NO<sub>x</sub> sensor of group II need not be calibrated in the manner set forth by group I. The subcombination has separate utility such as in exhaust manifolds not having an occlusion catalyst.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Abe Rosner on 3-28-2003 a provisional election was made without traverse to prosecute the invention of group I, claims 16-23 and 39.

Affirmation of this election must be made by applicant in replying to this Office action. Claims

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24 and 25 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

#### ***Information Disclosure Statement***

6. The information disclosure statement filed on 2-6-2002 would appear to be incomplete. Only sheet "1 of 2" was present in the statement. The examiner requests the applicant provide the second sheet of the information disclosure statement (presuming the second sheet does exist).

#### ***Specification***

7. The abstract of the disclosure is objected to because the described subject matter is not the subject matter of the claims. The abstract discusses estimating levels of moisture (a subject of a copending application) whereas the claims are drawn to the calibration of sensor output. Correction is required. See MPEP § 608.01(b).

#### ***Claim Rejections - 35 USC § 112***

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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9. Claims 16-21 and 39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10. Claims 16-18 repeatedly utilize indirect limitations to define the invention. In particular, claims 16-18, applicant claims “specifying the zero concentration of said specific component, based on a detection output of the gas sensor”. It is unclear what specific process steps are involved in the performance of this step. Does specifying the zero concentration imply that there is a step of exposing the sensor to a zero concentration? What does it mean to *specify* a zero concentration? Does that mean to *measure* a zero concentration? Clarification is requested. Furthermore, claims 17 and 18 have indirect limitations concerning how the concentration of the specific component is specified. However, these limitations should be more clearly recited prior to the limitation drawn to the actual specifying of the zero concentration.

11. In claims 16-18, the terms “the zero point” and “the calibrated detection output” lack antecedent basis.

12. Claim 19 has been amended to be drawn to “any one of claim 16”. Applicant should delete the “any one of”.

13. In claim 39, it is unclear if step (6) is a repetition of step (4) with the condition of introducing atmospheric air or if applicant is merely further specifying how step (4) is being performed. In addition, it is unclear where the atmospheric air is being introduced into (the flow channel?).

14. In claim 39, applicant specifies the vague step of “calibrating zero point of said basic NO<sub>x</sub> concentration”. It is unclear what is specifically being called for with this step. Is

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applicant measuring the NO<sub>x</sub> concentration at that atmospheric air and utilizing that as the zero point? Is applicant utilizing that zero point for anything? Applicant merely sets forth that a zero point is created with no proviso as to what that zero point is for or how it is utilized.

***Claim Rejections - 35 USC § 102***

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

16. Claims 16-20, 22, 23, and 39 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kato et al (SAE paper no. 970,858) (hereafter “Kato ‘858”).

17. With respect to the claims 16 and 19 as best understood, Kato ‘858 sets forth a method for detecting the concentration of a specific component (NO<sub>x</sub>) in an exhaust gas. Kato ‘858, discloses calibrating the output of the sensor with respect to the concentration of the NO<sub>x</sub> being measured, including a zero point for NO<sub>x</sub> concentration (fig. 2a, 3 and 4). Once the response of the sensor is determined with respect to the NO<sub>x</sub> concentration, the calibration data points (including the zero point) are utilized to fit the sensor’s current response to a line, which would then be utilized for the detection of the concentration of NO<sub>x</sub> in all subsequent measurements. Hence Kato ‘858 teaches detecting the concentration of the specific component based on the calibrated detection output.

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18. With respect to claims 17 and 18 as best understood (those limitations not covered above), Kato '858 teaches calibrating the sensor under a number of conditions including specifically at a rich air/fuel ratio (fig. 4b). Although Kato '858 does not explicitly recite the calibration procedure as occurring during a fuel cut procedure (although presumably the fuel was cut when the vehicle speed in fig. 7 was decelerating or was zero), one possessing ordinary skill in the art would recognize that cutting the fuel supply is one manner of arriving at a zero concentration point for NO<sub>x</sub> because the NO<sub>x</sub> concentration principally stems from the NO<sub>x</sub> released by consumed fuels and in the absence of those fuels would result in negligible levels of NO<sub>x</sub> (notice how the NO<sub>x</sub> concentration goes to zero in fig. 7a whenever the vehicle is being decelerated or stopped in fig. 7c).

19. With respect to claims 20 and 39 as best understood (those limitations not already discussed above), see fig. 1 and the discussion of fig. 1 on p. 200.

20. With respect to claims 22 and 23 as best understood (those limitations not already discussed above), although Kato '858 does not explicitly set forth what driving conditions contributed to the zero points shown in fig. 2a, 3 and 4, one possessing ordinary skill in the art would clearly recognize that during deceleration or stopping of the vehicle, NO<sub>x</sub> concentration would be zero because the NO<sub>x</sub> concentration principally stems from the NO<sub>x</sub> released by consumed fuels and in the absence of those fuels would result in negligible levels of NO<sub>x</sub> (notice how the NO<sub>x</sub> concentration goes to zero in fig. 7a whenever the vehicle is being decelerated or stopped in fig. 7c).

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21. Claims 16, 17, 22, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Itsuji et al (USP 4,676,213) with or without evidence provided by Weidenmann et al ("Exhaust Gas Sensors" from Automotive Electronics Handbook, 1995).
22. Itsuji discloses a method a specific component in an exhaust gas (O<sub>2</sub>) using a gas sensor. Itsuji teaches calibrating the sensor response by measuring the detection output at a particular condition (i.e. when the fuel has been cut to the engine (col. 10, lines 44-51)). Under said fuel cutting, the oxygen exposed to the sensor goes to substantially the same level as the oxygen in the atmosphere (fig. 11). Based on said detection output, the calibration for the sensor response is changed for the entire sensor operating range including  $\lambda=0.8$  (fig. 10 and col. 10, line 52 through col. 11, line 45). Although the  $\lambda=0.8$  is not explicitly identified as the "zero point of a detection output" as defined by the claims, it would appear to be the lowest concentration measurement identified by Itsuji and would thereby read on "zero point" giving the claim language its broadest reasonable interpretation. Alternatively, Wiedenmann evidences that  $\lambda=0.8$  corresponds to essentially zero concentration of oxygen in the measured gas (fig. 6.1). Said calibration of Itsuji is utilized for subsequent measurements so the calibration set forth above is utilized for detecting the concentration of the specific component based on the calibrated detection output (col. 11, line 49 through col. 12, line 14).

***Claim Rejections - 35 USC § 103***

23. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are



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such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

24. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

25. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kato '858 in view of Kato et al (USP 5,953,907) (hereafter "Kato '907). Although Kato '907 does not have a filing date which precedes all of the foreign priority documents (of which certified translations were provided during the prosecution of 09/045,938), an inspection of the translated documents indicates that the subject matter of the instant invention was first disclosed in the foreign priority document 9-264,972 dated 9-11-1997 and Kato '907 thereby qualifies as prior art.

26. Kato '858 set forth all the limitations of the claim, but did not disclose the presence of a NOx downstream from an occlusion catalyst. Kato '907 (which has overlapping inventorship to the authorship of Kato '858) teaches a configuration of exhaust system where a NOx sensor 40 is mounted downstream from a NOx absorbing (i.e. an occluding) catalyst (fig. 1-3). Said configuration of catalyst and sensor allows the engine to be operated at a more efficient lean air/fuel ratio while reducing the release of NOx from the exhaust gas (see Background and Summary of Kato '907). It would have been obvious to one of ordinary skill in the art at the time the invention was being made to utilize the teaching of Kato '907 for the detection method

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of Kato '858 in order to allow the engine to be operated lean while minimizing smog forming NOx emissions. With respect to utilizing a rich air/fuel ratio for measuring the zero point, fig. 4 of Kato '907 shows that the lowest levels of NOx are when the engine is operated in a rich manner.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaj Olsen whose telephone number is (703) 305-0506. The examiner can normally be reached on Monday through Thursday from 7:00 AM-4:30 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner are unsuccessful, the examiner's supervisor, Mr. Nam Nguyen, can be reached at (703) 308-3322.

When filing a fax in Group 1700, please indicate in the header "Official" for papers that are to be entered into the file, and "Unofficial" for draft documents and other communications with the PTO that are not for entry into the file of this application. This will expedite processing of your papers. The fax number for regular communications is (703) 305-3599 and the fax number for after-final communications is (703) 305-5408.

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Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, whose telephone number is (703) 308-0661.

A handwritten signature in black ink, appearing to read 'Kaj K. Olsen', with a long horizontal flourish extending to the right.

Kaj K. Olsen  
Patent Examiner  
AU 1753  
April 2, 2003